

REMARKS

The claims have been amended to better define the claimed invention, and better distinguish the claimed invention from the prior art. More particularly, independent claim 2 has been amended to stress that the spacers are deformed due to a difference between atmospheric pressure and a negative pressure inside the panel the first spacer is elastically deformable at first from an initial size to a size corresponding to the appropriate cell gap prior to that a gap at the seal member is reached to the appropriate cell gap. Independent claims 7 and 8 have been similarly amended, and a new claim 9 has been added to further scope the invention. The support is found in the original application, for example, in Figs. 3A-3C which illustrate the spacers located at the central portion of the panel being deformed firstly together with the liquid crystal and provide an appropriate cell gap prior to that the gap so that the seal member achieves the desired value. This is in complete contrast to the conventional (APA) process using the liquid crystal injection method where the gap at the seal member is fixed at first and then the cell gap at central portion of the pane is determined by the gap member.

Turning to the art rejections, and considering first the rejection of claims 2 and 4-6 as obvious from Applicant's prior art (APA) in view of Shin et al., as discussed in Applicant's previous amendment incorporated by reference, and in detail in the present specification, the present invention is based on an observation that the liquid crystal falling-drop method which is a well known method, has unique problems in terms of deformation of the incomplete panel in the center portion. As discussed in Amendment A, incorporated here by reference, in a conventional liquid crystal injection method, since the seal portion has an injection hole, it is possible to restore an appropriate cell gap at the liquid crystal injecting step. This is quite

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different from the falling-drop method where the liquid crystal is sealed within the pane and thus, once a non-uniform cell gap is formed, it is difficult to restore an appropriate cell gap. The present invention, prevents the central spacers from being excessively collapsed to a size smaller than the appropriate cell gap due to atmospheric pressure exerted by the LCD panel (see specification page 13).

Shin et al. merely shows a liquid crystal injection method and is by no means related to the falling-drop method. Although the material of Shin et al.'s spacers 40 is not disclosed in Shin et al., it is clear from the shapes of spacers 40 shown in Fig. 6 of Shin et al. that the spacers 40 have plasticity rather than elasticity. Accordingly, Shin et al. cannot be said to supply the missing teachings to the APA to achieve or render obvious the claimed invention.

Turning to the rejection of claim 3 as obvious from the APA and further in view of Teraguchi et al. and Hiraishi et al., claim 3 is dependent on claim 2. The deficiencies of the APA vis-à-vis claim 2 are discussed above. It is submitted that neither Teraguchi et al., nor Hiraishi et al. alone or in combination supply the missing teachings to the APA to achieve render obvious claim 2, or claim 3 which depends thereon. Teraguchi et al. and Hiraishi et al. are cited to show the sealing portion with a spacer. However, there is no hint as to the falling-drop method and its unique problems. In the rejection, the Examiner cites Hiraishi et al. as teaching spacers formed of a material which is hardly deformed when pinched between the substrates under atmospheric pressure. Even assuming arguendo the Examiner's interpretation of Hiraishi et al., Hiraishi et al.'s seal member does not include a deformable material surrounding the hardly deformable core as required by Applicant's claims. Thus, no combination of the APA and either or both of the

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secondary references applied to reject claim 3 can be said to achieve or render obvious claim 2, as amended, claim 3 which is dependent thereon.

Turning to the rejection of claims 7 and 8 as obvious from the APA in view of JP 987 to Iwata et al., Iwata et al., also fails to teach a liquid crystal falling-drop method. Rather, only a structure suited for a liquid crystal injection method is disclosed. As a matter of fact, in Iwata et al., a resin ball 5 is described by using the technical terms of a "gap member" rather than "spacer member". In Iwata et al., a glass bead 3 in a seal member 4 is called as a "spacer member", but the resin ball 5 is not called "spacer" at all. This is because the resin ball 5 is provided to form a vacant cell or volume surrounded with a seal member 4 for allowing liquid crystal to be injected to the vacant cell.

Although the resin ball 5 may act as a spacer for a completed display panel after injecting the liquid crystal, this does not teach the process of the present claimed invention. In Iwata et al. the resin ball 5 is deformed at the process of forming the panel with no liquid crystal and, needless to say, the seal member 4 is hardened before injecting the liquid crystal into the vacant panel. This is in contrast to the present claimed invention where the seal member is not hardened yet at the step of filling the liquid crystal and the spacer member is deformed together with the liquid crystal during the step of putting the panel under atmospheric pressure to deform the spacer through a deformation of the panel due to difference between said atmospheric pressure and negative pressure inside said panel as set forth in amended claims 7 and 8. Thus, neither claims 7 or 8 can be said to be obvious from the APA in view of Iwata et al.

New claim 9 has been added to further scope the invention and is allowable for the same reasons above adduced relative to claims 2-8, as well as for its own additional limitations.

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Form PTO-2038 in the amount of \$1,680.00 is enclosed for Extension and RCE Fees.

Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance. Early and favorable action are respectfully requested.

In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account Number 08-1391.

Respectfully submitted,



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I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: MAIL STOP - RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 8, 2003, at Tucson, Arizona.

By 

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